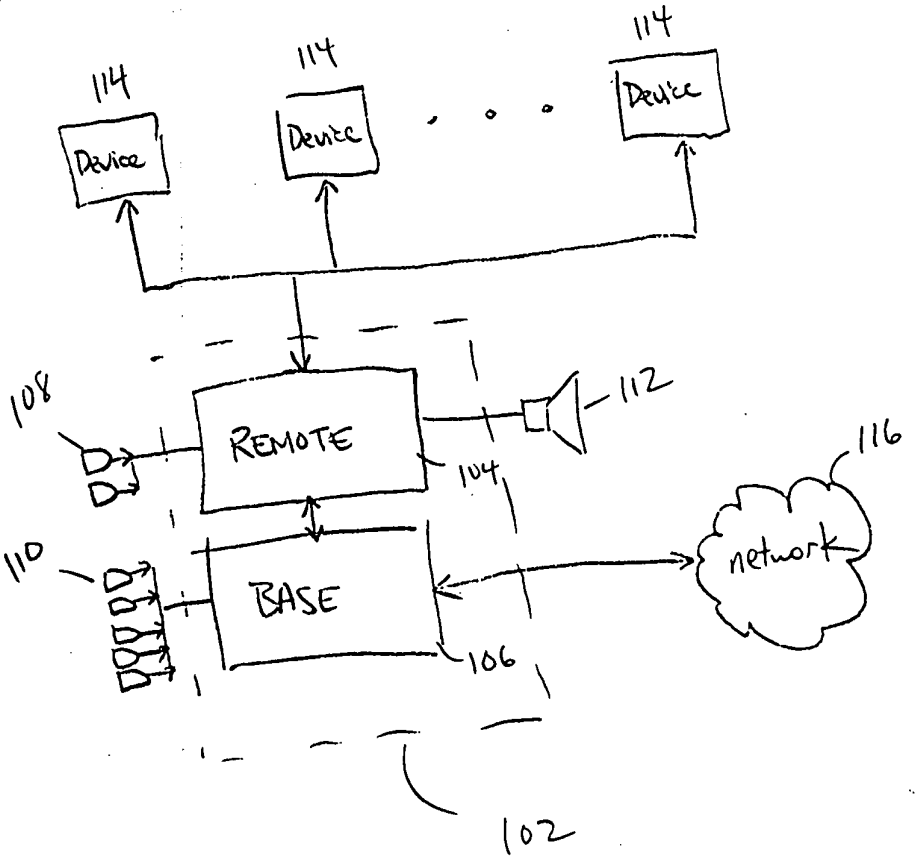
114
Device
114
Device
114
Device
108
REMOTE
112
104
116
network
110
BASE
106
102

FIG. 1

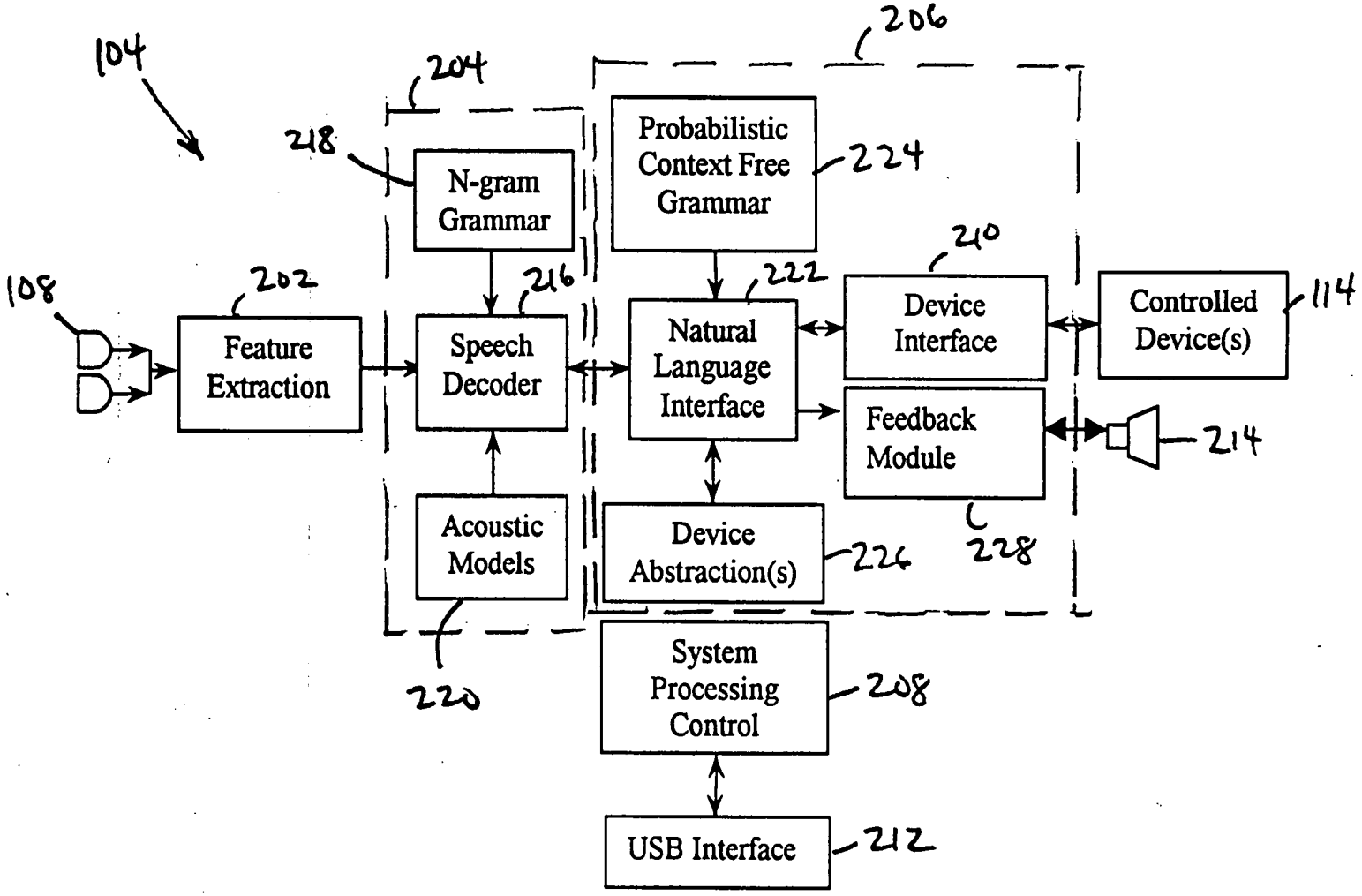
104
206
204
218
N-gram Grammar
Probabilistic Context Free Grammar
224
240
108
202
216
222
Feature Extraction
Speech Decoder
Natural Language Interface
Device Interface
Controlled Device(s)
114
Feedback Module
214
Acoustic Models
Device Abstraction(s)
226
228
220
System Processing Control
208
USB Interface
212

FIG. 2

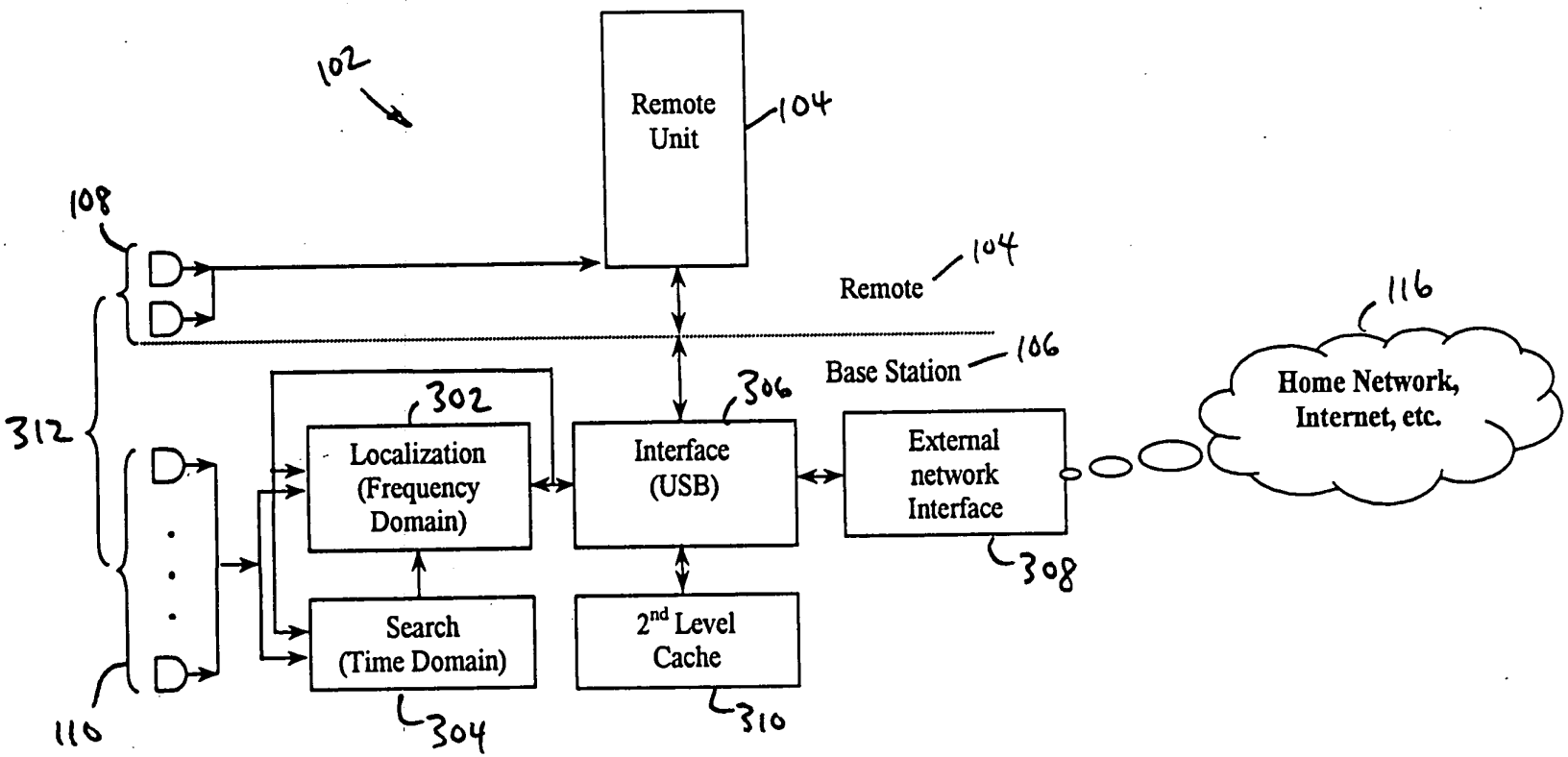
102
Remote Unit
104
108
Remote
104
116
Base Station
106
Home Network, Internet, etc.
312
302
306
Localization (Frequency Domain)
Interface (USB)
External network Interface
308
Search (Time Domain)
304
2nd Level Cache
310
110

FIG. 3

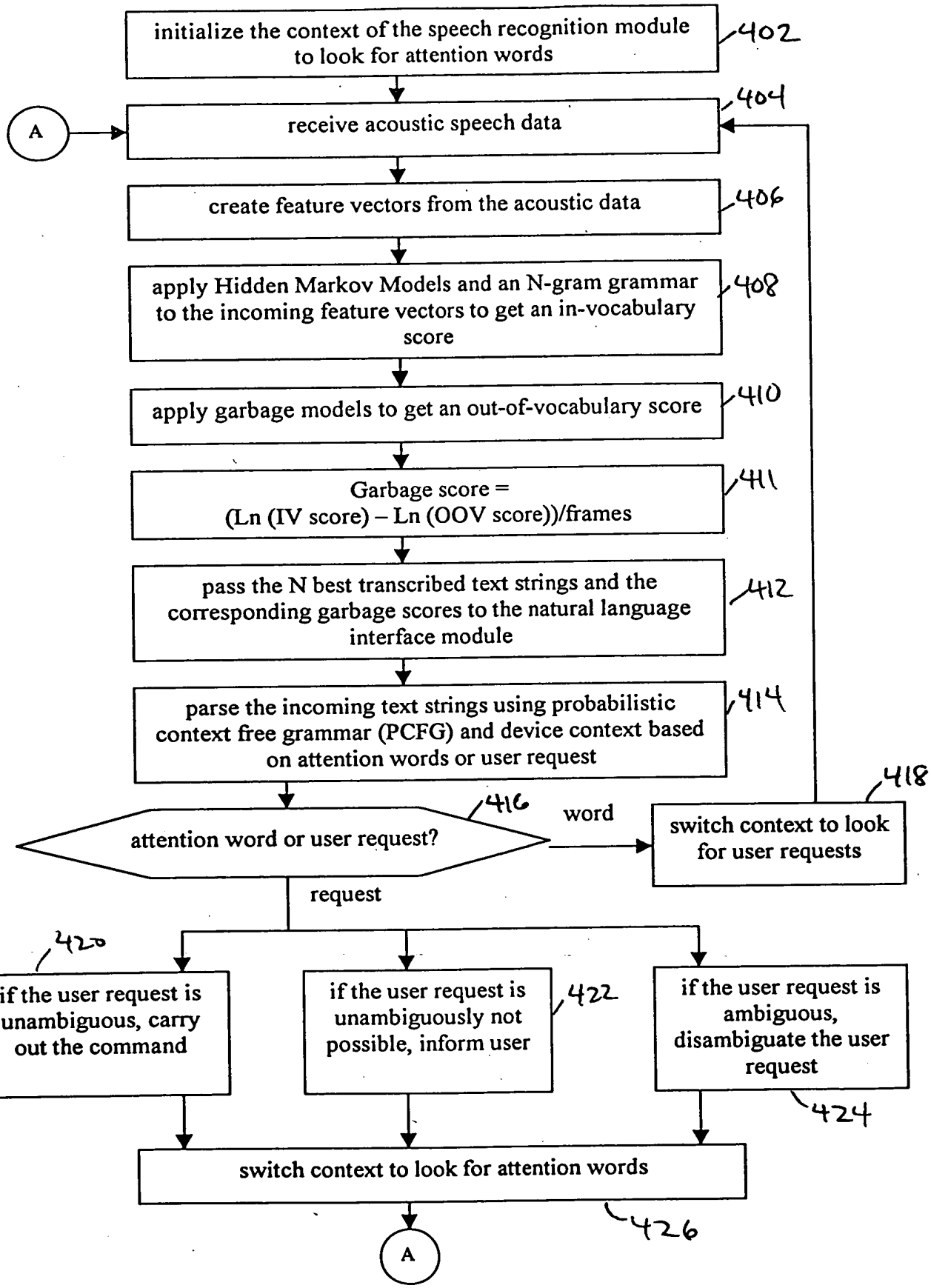
initialize the context of the speech recognition module to look for attention words
402
A
receive acoustic speech data
404
create feature vectors from the acoustic data
406
apply Hidden Markov Models and an N-gram grammar to the incoming feature vectors to get an in-vocabulary score
408
apply garbage models to get an out-of-vocabulary score
410
Garbage score = (Ln (IV score) – Ln (OOV score))/frames
411
pass the N best transcribed text strings and the corresponding garbage scores to the natural language interface module
412
parse the incoming text strings using probabilistic context free grammar (PCFG) and device context based on attention words or user request
414
attention word or user request?
416
word
switch context to look for user requests
418
request
if the user request is unambiguous, carry out the command
420
if the user request is unambiguously not possible, inform user
422
if the user request is ambiguous, disambiguate the user request
424
switch context to look for attention words
426
A

FIG. 4